

I CLAIM AS MY INVENTION:

1. A data transmission system comprising:
a stationary part;
a rotary part rotatable relative to said stationary part;
a source of gigabit/sec data at said rotary part, said data being subject to jitter;
a slip ring system for transmitting said data from said rotary part to said stationary part, said slip ring system having a rotary slip ring module at said rotary part and a stationary slip ring module at said stationary part;
a first gigabit/sec data link proceeding from said source at said rotary part;
a first clock regenerator connected to said first data link at said rotary slipping module;
a receiver for said gigabit/sec data at said stationary part;
a second gigabit/sec data link proceeding to said receiver at said stationary part;
and
a second clock regenerator connected to said second data link at said stationary slip ring module, said first and second clock regenerators synchronizing said gigabit/sec data, proceeding from said first data link and proceeding to said second data link, to a stable reference clock to prevent said jitter from proceeding from said source to said receiver.

2. A data transmission system as claimed in claim 1 wherein said first and second clock regenerators are serial clock regenerators.

3. A data transmission system as claimed in claim 2 wherein said jitter includes high frequency jitter, and wherein each of said serial clock regenerators

comprises a recovery clock, and a clock and data recovery circuit which eliminates said high frequency jitter by synchronizing outgoing data to said recovery clock.

4. A data transmission system as claimed in claim 2 wherein each of said serial clock regenerators has a local reference clock, and a clock and data recovery circuit which eliminates all of said jitter by synchronizing outgoing data to said local reference clock.

5. A data transmission system as claimed in claim 1 wherein each of said first and second clock regenerators is a parallel clock regenerator.

6. A data transmission system as claimed in claim 5 wherein each of said parallel clock regenerators includes a local reference clock and serialization and deserialization circuits which eliminate all of said jitter by synchronizing outgoing data to said local reference clock.

7. A data transmission system as claimed in claim 5 wherein each of said parallel clock regenerators includes a circuit for converting said gigabit/sec data into a plurality of data packets with idle cycles respectively between said data packets, and a synchronization circuit which synchronizes said gigabit/sec data by selectively discarding idle cycles between data packets.

8. A data transmission system as claimed in claim 7 wherein each of said parallel clock regenerators calculates acycling redundancy check code for each of said packets, and wherein said parallel clock regenerator at said rotary part transmits said cycling redundancy check code to said source for minimizing jitter in said first data link and wherein said parallel clock regenerator at said stationary part transmits said cycling redundancy check code to said receiver for eliminating jitter in said second data link.

9. A data transmission system as claimed in claim 1 wherein said rotary part comprises a computed tomography apparatus gantry having an x-ray source and a radiation detector mounted therein for rotation with said gantry, said radiation detector forming said source of gigabit/sec data and generating said gigabit/sec data dependant on radiation incident on said radiation detector attenuated by an examination subject as said gantry is rotated around said examination subject, and wherein said stationary part comprises an imagery construction system which reconstructs an image of said subject from said gigabit/sec data.

10. A data transmission system as claimed in claim 9 wherein said source of gigabit data comprises a radiation detector having a plurality of parallel rows of radiation detector elements disposed adjacent to each other in a direction parallel to a rotational axis of said gantry.

11. A method for transmitting gigabit/sec data comprising the steps of:
providing a stationary part and a rotary part that is rotatable relative to said stationary part;
generating gigabit/sec data at a source at said rotary part, said data being subject to jitter;
transmitting said data from said rotary part to said stationary part via a slip ring system, said slip ring system having a rotary slip ring module at said rotary part and a stationary slip ring module at said stationary part;
transmitting said data via said a first gigabit/sec data link at said rotary part proceeding from said source to said rotary slip ring module;
connecting a first clock regenerator to said first data link at said rotary slip ring module;

providing a receiver for said gigabit/sec data at said stationary part;
transmitting said gigabit/sec data via a second data link at said stationary part
proceeding from said stationary slip ring module to said receiver;
connecting a second clock regenerator to said second data link at said
stationary slip ring module; and
operating said first and second clock regenerators in combination to synchronize
said gigabit/sec data, proceeding from said first data link and proceeding
to said second data link, to a stable reference clock to prevent said jitter
from proceeding from said source to said receiver.

12. A method as claimed in claim 11 comprising providing a first serial clock regenerator as said first clock regenerator and providing a second serial clock regenerator as said second clock regenerator.

13. A method as claimed in claim 12 wherein said jitter includes high-frequency jitter, and comprising the step of, at each of said first and second serial clock regenerators, eliminating said high-frequency jitter by synchronizing outgoing data to a recovery clock.

14. A method as claimed in claim 12 comprising, at each of said first and second serial clock regenerators, eliminating all of said jitter by synchronizing outgoing data to a local reference clock.

15. A method as claimed in claim 11 comprising providing a first parallel clock regenerator as said first clock regenerator and providing a second parallel clock regenerator as said second clock regenerator.

16. A method as claimed in claim 15 comprising, at each of said first and second parallel clock regenerators, eliminating all of said jitter by synchronizing outgoing data to a local reference clock in serialization and de-serialization circuits.

17. A method as claimed in claim 15 comprising, at each of said first and second parallel clock regenerators, converting said gigabit/sec data into a plurality of data packets with idle cycles respectively between said data packets, and selective discarding idle cycles between data packets to synchronize said gigabit/sec data.

18. A method as claimed in claim 17 comprising, at each of said first and second parallel clock regenerators, calculating a cycling redundancy check code for each of said packets, and transmitting the cycling redundancy check code calculated at said first parallel clock regenerator to said source for minimizing jitter in said first data link, and transmitting said cycling redundancy check code from said second parallel clock regenerator to said receiver for eliminating jitter in said second data link.

19. A method as claimed in claim 11 comprising generating said gigabit/sec data by providing a radiation detector as said source, and irradiating said radiation detection with x-rays with an examination subject disposed in a path of said x-rays so that attenuated x-rays are incident on said radiation detector, while rotating said gantry, to generate measurement data from said detector as said gigabit/sec data.

20. A method as claimed in claim 19 wherein said gantry is rotated around a rotational axis, and comprising the step of providing a radiation detector having a plurality of parallel rows disposed next to each other along said access.